



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
[www.uspto.gov](http://www.uspto.gov)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/672,205	09/26/2003	Akihiro Masuda	3557G-000043	8963
27572	7590	09/08/2004	EXAMINER	
HARNESS, DICKEY & PIERCE, P.L.C.				BELLO, AGUSTIN
P.O. BOX 828				
BLOOMFIELD HILLS, MI 48303				
ART UNIT		PAPER NUMBER		
		2633		

DATE MAILED: 09/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

AP

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>
	10/672,205	MASUDA ET AL
	<b>Examiner</b>	<b>Art Unit</b>
	Agustin Bello	2633

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on \_\_\_\_\_.  
 2a) This action is **FINAL**.                    2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-6 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-6 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 26 September 2003 is/are: a) accepted or b) objected to by the Examiner.  
     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____ .  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>1/5/04</u> . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
|  | 6) <input type="checkbox"/> Other: _____ .                                  |

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-5 are rejected under 35 U.S.C. 102(e) as being anticipated by Naganuma (U.S. Patent No. 6,370,285).

Regarding claim 1, Naganuma teaches a variable optical equalizer (Figure 6) interposed in an optical fiber (reference numeral 1a in Figure 6) forming an optical transmission line (reference numerals 1a – 1b in Figure 6), comprising: an input-side fiber collimator (reference numeral 4a in Figure 6) which emits in the form of a beam signal light transmitted over the optical fiber (column 7 lines 14-15); an output-side fiber collimator (reference numeral 4b in Figure 6) which causes the optical fiber to transmit the signal light input in the form of a beam (as seen at the output of reference numeral 4b in Figure 6); and a variable Faraday rotator (reference numeral 12a in Figure 6) and a polarization dependent element (reference numeral 11, 13 in Figure 6) which are disposed on an optic axis extending between the input-side fiber collimator and the output-side fiber collimator (as see in Figure 6).

Regarding claim 2, Naganuma teaches a variable optical equalizer according to claim 1, further comprising: a birefringent plate (reference numeral 14 in Figure 6) which separates by polarized wave a beam of light emitted from the input-side fiber collimator (reference numeral 4a in Figure 6) into two beams of light (e.g. “Or” and Ex” in Figure 6); a  $\lambda/2$  wave plate

(reference numeral 15 in Figure 6) which causes the separated two beams of light to have the same direction of polarization (column 7 lines 35-46) for input to the polarization dependent element (reference numerals 11, 13 in Figure 6); a  $\lambda/2$  wave plate (reference numeral 18b in Figure 6) which causes the direction of polarization of the two beans of light emitted from the polarization dependent element (reference numeral 11, 13 in Figure 6) to be orthogonal (as noted by the arrow and circle in reference numeral 18a in Figure 6) to each other, and a birefringent plate (reference numeral 18a in Figure 6) which combines the two beams of light whose directions of polarization are caused to be orthogonal to each other (as noted by the arrow and circle in reference numeral 18a in Figure 6) into a single beam of light for input to the output-side fiber collimator (reference numeral 4b in Figure 6).

Regarding claim 3, Naganuma teaches a variable optical equalizer according to claim 1, wherein the variable Faraday rotator (reference numerals 12a, 17a in Figure 6) is disposed both at the input and at the output of the polarization dependent element (reference numeral 11, 13 in Figure 6).

Regarding claim 4, Naganuma teaches a variable optical equalizer according to claim 2 , wherein the  $\lambda/2$  wave plate intervenes in the two beams (reference numeral 15, 18b in Figure 6) of light separated by polarized wave.

Regarding claim 5, Naganuma teaches a variable optical equalizer according to any one of claim 1, wherein the polarization dependent element (reference numerals 11, 13 in Figure 6) is a birefringent plate (e.g. having a refractive index that differs for light of different polarizations as noted by Figure 1 and 7).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Naganuma in view of Islam (U.S. Patent No. 6,721,475).

Regarding claim 6, Naganuma teaches an optical multiplex transmission system combining a multiplicity of light signals each having a different wavelength (claim 1), for transmission over a single optical fiber (reference numeral 1a and 1b in the Figures) the optical multiplex transmission system comprising a variable optical equalizer according to any one of claims 1to5 (as claimed in the claims), for compensating for transmission characteristics of signal light (e.g. “eliminate dispersion” of column 8 lines 20-23). Naganuma differs from the claimed invention in that Naganuma fails to specifically teach that the compensation takes place on a wavelength-by-wavelength basis. However, Islam teaches that polarization dispersion compensation of multiwavelength signal on a wavelength-by-wavelength basis is well known in the art (column 26 lines 1-14). As noted by Islam, each wavelength of a multiwavelength signal rotates in polarization differently as it traverses the optical fiber. Islam further notes that in order to compensate for this, polarization dispersion compensation must be done on a wavelength-by-wavelength basis. As such, one skilled in the art would have been motivated to perform compensation on a wavelength-by-wavelength basis in a system comprising the variable optical equalizer of Naganuma in order to overcome the negative effects of polarization mode

dispersion. Islam contemplates such a system (Figures 10 - 14). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to compensate a multiwavelength signal with the variable optical equalizer of Naganuma on a wavelength-by-wavelength basis as Islam teaches is necessary.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Agustin Bello whose telephone number is (703)308-1393. The examiner can normally be reached on M-F 8:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703)305-4729. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Agustin Bello  
Examiner  
Art Unit 2633

AB

